

**PACIFIC SALMON COMMISSION
TRANSBOUNDARY TECHNICAL
COMMITTEE REPORT**

**SALMON MANAGEMENT AND ENHANCEMENT
PLANS FOR THE STIKINE, TAKU
AND ALSEK RIVERS, 1993**

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PREFACE

This report is published annually by the Transboundary Technical Committee prior to the beginning of the fishing season so that each nation understands the objectives and procedures used in managing relevant transboundary fisheries and assessing stock status. The publication of this year's report was delayed because negotiations between the U.S. and Canada regarding expired portions of Annex IV of the Pacific Salmon Treaty were not completed until late June of this year, and substantial portions of the report were dependent on the results of these negotiations.

EXECUTIVE SUMMARY

Management of the transboundary Stikine, Taku, and Alsek rivers to achieve conservation and allocation objectives stipulated by the Pacific Salmon Treaty requires close cooperation between Canada and the United States. This plan has been developed to assure that each Party has a clear understanding of objectives and procedures used in managing relevant fisheries.

This report is organized by river system and salmon species. For each species within each drainage, the preseason forecast, spawning escapement goals, harvest sharing objectives, and management procedures are presented. For salmon stocks of the Stikine River, details of the stock assessment program are also presented.

A preseason forecast of 135,000 fish was used in the Stikine Management Model (SMM) to guide fishing patterns for the first two weeks of the season giving a total allowable catch of 81,000 fish that could be shared by the two Parties. The Stikine River escapement goal has been reduced in 1993 from 60,000 to 54,000 sockeye salmon as a result of lowering the goal for the Tahltan Lake component stock from 30,000 to 24,000 fish. Inseason predictions of run size during the 1993 season, as determined by the Stikine Management Model, are based on historical data from 1982 to 1992. The stock assessment program for the Stikine River run is similar to last year, with the exception that inseason scale pattern analysis will not be used to estimate marine contributions of Stikine River stocks; rather, average weekly stock compositions from the years 1986-1992 will be used inseason to estimate the U.S. marine harvest of Stikine River sockeye salmon. The 1993 run of chinook salmon to the Stikine River is expected to be above average, while the return of coho salmon is expected to be average. There are no major changes to the management plans for the other species of salmon originating in the Stikine River.

It is expected that the run sizes of Taku River sockeye and chum salmon will be below average; the coho and odd-year pink salmon run are expected to be average; and the chinook run is expected to be above average. Management of Taku River salmon stocks will be similar to that of previous years.

Alsek River chinook and coho salmon run sizes are expected to be average in 1993. The overall sockeye run is expected to be below average, with below average early and late run components. No major changes to the management plan for Alsek salmon are anticipated.

Sockeye salmon enhancement will continue in 1993 in the Stikine and Taku drainages. The following fry out-plants from the 1992 egg-takes occurred in June and July: 1.9 million to Tahltan and 2.0 million to Tuya lakes; 0.9 million to Tatsamenie Lake; and 1.1 million to Trapper Lake. Green-egg to outplanted-fry survival rates were 90.4% for Tahltan Lake fry, 72.7% for Tuya Lake fry, 61.2% for Tatsamenie Lake fry, and only 44.2% for Trapper Lake fry. Outbreaks of IHNV resulted in the mortality of 0.9 million fry that were to be planted into Trapper Lake, 0.5 million that were to be planted into Tuya Lake, and 0.3 million that were to be planted into Tatsamenie Lake. Egg-take targets for the fall of 1993 are as follows: 6.0 million at Tahltan Lake; 2.0 million at Little Tatsamenie Lake; and 1.0 million at Little Trapper Lake.

Most of the stock assessment and research programs conducted in 1992 will be continued in 1993. Notable exceptions include elimination of the inseason scale pattern analysis of District 106 and 108 sockeye salmon catches, cancellation of the operation of the Little Tatsamenie Lake weir for coho salmon enumeration, and delay of the planned second year of Taku River coho salmon radio tagging until 1994. New programs include an otolith sampling program in District 108 to estimate contribution of enhanced sockeye salmon and several new or expanded projects involved with assessment of sockeye salmon enhancement programs.

INTRODUCTION

Management of transboundary river salmon to achieve conservation, allocation and enhancement objectives, as stipulated by the Pacific Salmon Treaty, requires a cooperative approach by Canada and the United States. It is important that both Parties have a clear understanding of the objectives and agree upon procedures to be used in managing the fisheries, including the criteria upon which modifications of fishing patterns will be based. This document is intended to facilitate cooperative management by presenting the 1993 forecasts, summarizing the management and enhancement goals, and outlining the procedures to be used by the Canadian Department of Fisheries and Oceans (DFO) and the Alaska Department of Fish and Game (ADF&G) during the conduct of the 1993 fisheries on the Stikine, Taku and Alsek river salmon stocks. With the exception of Stikine sockeye salmon, for which a numerical forecast is required by the Treaty, forecasts are given qualitatively, with reference to brood year escapement data where available.

STIKINE RIVER

Sockeye Salmon

Preseason Forecast

A preliminary preseason forecast of 135,000 fish was made prior to the fishing season and was used in the Stikine Management Model (SMM) to guide fishing patterns for the first two weeks of the season. Given an escapement goal of 54,000 sockeye salmon, the preseason forecast of total allowable catch (TAC) is 81,000 sockeye salmon. After statistical week 27, the inseason estimate of TAC takes precedence.

Refinements to the forecast analysis due to data updates were made after statistical week 27 and the resulting 1993 Stikine River sockeye forecast became 143,339 fish of which 43% (62,300) are predicted to be of Tahltan Lake origin. The 1993 prediction is derived by averaging a sibling forecast of 84,800 Tahltan fish and smolt forecast of 39,800 Tahltan fish, and adding this to the forecast of 81,039 non-Tahltan sockeye salmon which is the average of a sibling forecast (106,236 sockeye) and a spawner-recruit forecast (55,842 sockeye). Although these revised estimates better reflect the data and method on hand, they were not used in early management decisions.

Tahltan Lake Sockeye Forecast: There is a linear correlation between the returns of age-1.2 sockeye salmon in one year and the total run the following year for some stocks. Most of the linear relationship is due to the strong correlation among sibling returns for a given brood year. The "sibling forecast" for Stikine sockeye salmon stocks predicts the total run in a given year from the age-1.2 return in the previous year, whereas, a true sibling forecast usually predicts age-specific returns of siblings from a common brood year.

The 1993 sibling forecast for Tahltan Lake sockeye salmon was based on data from 1983 through

1992. Runs were reconstructed using age-specific data from catches in U.S. Districts 106 and 108 commercial and test fisheries, the Canadian lower river commercial and test fisheries and upper river commercial and Indian food fisheries, and from the escapement. For years in which U.S. test fishery catches were not sampled, catches were assumed to have the same weekly age and stock compositions as the appropriate commercial catches. It was assumed that 90% of the Canadian commercial and Indian food fishery catches of sockeye salmon in the upper Stikine River were composed of fish originating from Tahltan Lake; it was also assumed that the age composition of the portion of the catch assumed to be of Tahltan Lake origin was the same as the Tahltan Lake escapement. A linear regression of age-1.2 Tahltan sockeye salmon ($T_{1,2}$) on the following year's total run (catch and escapement, all ages) of Tahltan sockeye salmon (T) for the years 1983 to 1992 yielded the following equation:

$$T = 16,655 + 8.178 \times (T_{1,2})$$

The coefficient of correlation (r) of this relationship is 0.88. Based on the above equation, and the total return estimate of 8,360 age-1.2 sockeye in 1992, the 1993 sibling forecast for Tahltan sockeye salmon is 84,800 fish.

The Tahltan Lake sockeye smolt forecast is based on the average age-specific survivals of sockeye smolt emigrating from Tahltan Lake to subsequent age-specific adult returns. Since 1984, when smolt enumeration began, the average survival of age 1+ smolt to age-1.2 adults is 0.6% to age-1.3 adults is 4.2%. The average survival of age 2+ smolt to age-2.2 adults is 2.4% and to age-2.3, 5.8%. Applying these survival rates to the 1990 and 1991 smolt counts by age class, which are the years from which the 1993 adult run will originate, gives a smolt-based forecast for 1993 of 39,800 Tahltan sockeye salmon.

The average of the sibling- and smolt-based forecasts is 62,300 Tahltan Lake sockeye salmon, an above average run. The 1983-1992 average run size is 50,163 fish.

Non-Tahltan Lake Sockeye Forecast: The methods used to forecast the non-Tahltan Lake sockeye salmon forecast for 1993 include a sibling forecast technique and spawner-recruit regression analysis. The point estimate given for the 1993 forecast is the average of the forecasts derived from these methods. A brief description of each method and resulting forecast is given below.

The spawner-recruit non-Tahltan sockeye forecast was derived from data for the 1984 to 1992 sockeye runs. Runs were reconstructed using age-specific data from the U.S. District 106 and 108 commercial and test fisheries, the Canadian lower river commercial and test fisheries and upper river commercial and Indian food fisheries, and from the estimated escapements. For years in which U.S. test fishery catches were not sampled, catches were assumed to have the same weekly age and stock compositions as the appropriate commercial catches. It was assumed that 10% of the upper river commercial and Indian food fishery catches in Canada were composed of non-Tahltan stocks; it was also assumed that the age composition of the assumed catch was the same as that of the non-Tahltan sockeye catch in the lower river test fishery. Age-specific linearized Ricker spawner-recruit curves were fitted to the sockeye runs from 1984 to 1992. The 1993 spawner-recruit forecast for the non-Tahltan sockeye run is 55,842 fish.

The 1993 non-Tahltan sockeye sibling forecast was based on data from 1983 through 1992. Runs were reconstructed using age-specific data from catches and escapements as was done for the spawner-recruit forecast. A linear regression of age-1.2 non-Tahltan sockeye salmon ($N_{1,2}$) on the following year's total run (catch and escapement, all ages) of non-Tahltan sockeye salmon (N) for the years 1983 to 1992 yielded the following equation:

$$N = 11,193 + 7.445 \times (N_{1,2})$$

The coefficient of correlation (r) of this relationship is 0.83. Based on the above equation and a total return estimate of 12,767 age-1.2 non-Tahltan sockeye in 1992, the 1993 sibling forecast for non-Tahltan sockeye salmon is 106,236 fish.

The average of the spawner/recruit- and sibling-based forecasts is 81,039 non-Tahltan sockeye salmon. This also constitutes an above average run; the 1983-1992 average non-Tahltan run size is 59,387 fish.

Spawning Escapement Goals

Two sockeye stocks are recognized for the Stikine River: the Tahltan Lake stock which spawns in Tahltan Lake and the non-Tahltan stock which is a conglomerate of stocks which spawn elsewhere throughout the drainage. These stocks are considered to be independent. Surpluses or deficits in escapement realized in one stock shall not be used to balance deficits or surpluses in the other.

Spawning escapement goals have been established as ranges which reflect biological data regarding stock productivity, the ability of existing management systems to deliver established goals, the accuracy and precision of estimates of escapement generated by stock assessment programs, and the degree of risk considered acceptable. Our best judgement of the escapement goals for these stocks are:

Tahltan Lake Stock: In the spring of 1993, the Transboundary Technical Committee (TRTC) revised the escapement goal for Tahltan Lake, based on recommendations of an analysis conducted by DFO staff and reviewed by the Pacific Stock Assessment Review Committee (PSARC). The previous target of 30,000 fish was based largely on "professional judgement". Separate adult and fry stock recruitment analyses conducted on extensive data sets developed in recent years indicate that maximum sustained yield of wild fish is achieved at escapements of 15,000 - 19,000 spawners. The PSARC review recommendations were for a conservative revision of the escapement goal to 20,000 fish. The TRTC agreed upon a revised escapement goal of 24,000 fish, taking into account the escapement goal of 20,000 wild fish and the approximately 4,000 fish needed for broodstock to meet objectives of the current Stikine River enhancement program.

	TARGET = mid-point = 24k				
Escapement	0 - 12k	13k - 18k	18k - 30k	30k - 45k	>45k
Mgmt. Category	Red	Yellow	Green	Yellow	Red

Non-Tahltan Stocks: Spawning escapement goals for the non-Tahltan stock remain unchanged from previous years.

	TARGET = mid-point = 30k				
Escapement	0 - 15k	15k - 20k	20k - 40k	40k - 75k	>75k
Mgmt. Category	Red	Yellow	Green	Yellow	Red

A postseason estimate of escapement that falls within the Green Management Category shall be considered fully acceptable; one that falls within the Yellow Management Category shall be considered acceptable but not desired; and, one that falls within the Red Management Category shall be considered undesirable.

The following databases for the Tahltan Lake stock will be developed and exchanged for use in evaluating escapement goals:

1. total returns from various levels of spawning escapements;
2. smolt production as a function of the number of spawners; and
3. adult production as a function of the number of smolts.

The following databases for the non-Tahltan stock will be developed and exchanged for use in evaluating escapement goals:

1. total returns from various levels of spawning escapements;
2. survey counts of non-Tahltan escapement indices; and
3. inventory and assessment data regarding the historical pattern of distribution, abundance, and timing of spawning fish.

Methodology for the analysis of the above-named databases is being developed by the TRTC and will be used in reviewing escapement goals.

Harvest Sharing Objectives

The United States and Canada negotiated an extension of expiring harvest and management arrangements of Stikine River stocks for the 1993 fishing season; these arrangements are found in Annex IV, Chapter 1, of the Pacific Salmon Treaty as negotiated by the Pacific Salmon

Commission in February of 1988, and in 2 associated Understandings dated February of 1988 and February of 1989. As per the 1989 Understanding, the "Parties agree to manage the returns of Stikine River sockeye to ensure that each country obtains equal catches in their existing fisheries beginning in 1993. In 1993, 1994, and 1995, Canada may also utilize any fish surplus to escapement and broodstock requirements". For management of harvest shares in 1993, the TRTC interprets this statement to mean that the TAC will be shared 50/50 between the Parties; however, terminal catches in Canada taken under "Excess Salmon to Spawning Requirement" (ESSR) licenses will be excluded from the Canadian allotment.

Management Procedures

United States: The fishery in Section 6-A, B, C, and D (Sumner and Clarence Straits, Figure 1) will open on the third Sunday in June (June 20, statistical week 26). Returning Stikine River sockeye salmon are a primary management concern during the first four weeks of the fishery. After that time, other sockeye stocks and salmon species greatly overshadow Stikine sockeye salmon in the catch. District 108 is generally managed through mid-July with Stikine sockeye salmon as the primary management consideration. Subsequent openings in Districts 106 and 108, after mid-July, will be based upon run sizes determined from the Stikine Management Model plus other jointly agreed to measurements of abundance. Initial openings in District 108 will be restricted to the outer areas of the district in order to minimize the interception of adult chinook salmon. Chinook salmon catches will also be a management concern in District 106 throughout the season and, if large numbers of small feeder chinook are caught, night closures will be instituted.

Announcements for fishery openings throughout Southeast Alaska are made on Thursday afternoons for gillnet fisheries, which begin the following Sunday. The U.S. fishery has historically fished these districts for one to three days per week with occasional closures or longer fishing periods during extremes in stock abundance. If weekly catch-per-unit-effort (CPUE) is above average, extensions in fishing time could occur. Weekly fishing time is regulated on gross evaluations of run strength. Achieving the desired escapement goal into the Stikine River and into major Alaskan sockeye systems is the primary objective. The secondary objective is achieving the harvest sharing arrangement in effect. Fishing gear used in Districts 106 and 108 is similar; common sockeye net sizes are between 5 $\frac{1}{8}$ and 5 $\frac{1}{2}$ inches (130 - 140 mm) stretched mesh, 60 meshes deep and 300 fathoms (549 m) long.

Management responses that will be used to reduce the sockeye harvest would begin with restrictions in fishing time in District 108. Next, closures of that district would be used followed by restrictions in fishing time in Sumner Strait. Finally, the most complete restriction would be the additional closure of Sumner Strait. The management responses for more liberal fisheries would start with increases in fishing time in District 108 and would extend to increases in time in District 106. When both districts are open, the fishing times in each will coincide, if possible.

A number of domestic considerations are involved in the District 106 and 108 fisheries. In District 108, chum salmon returns into Frederick Sound are a management consideration beginning the end of June. Chum salmon run strength assessments are based upon CPUE in test

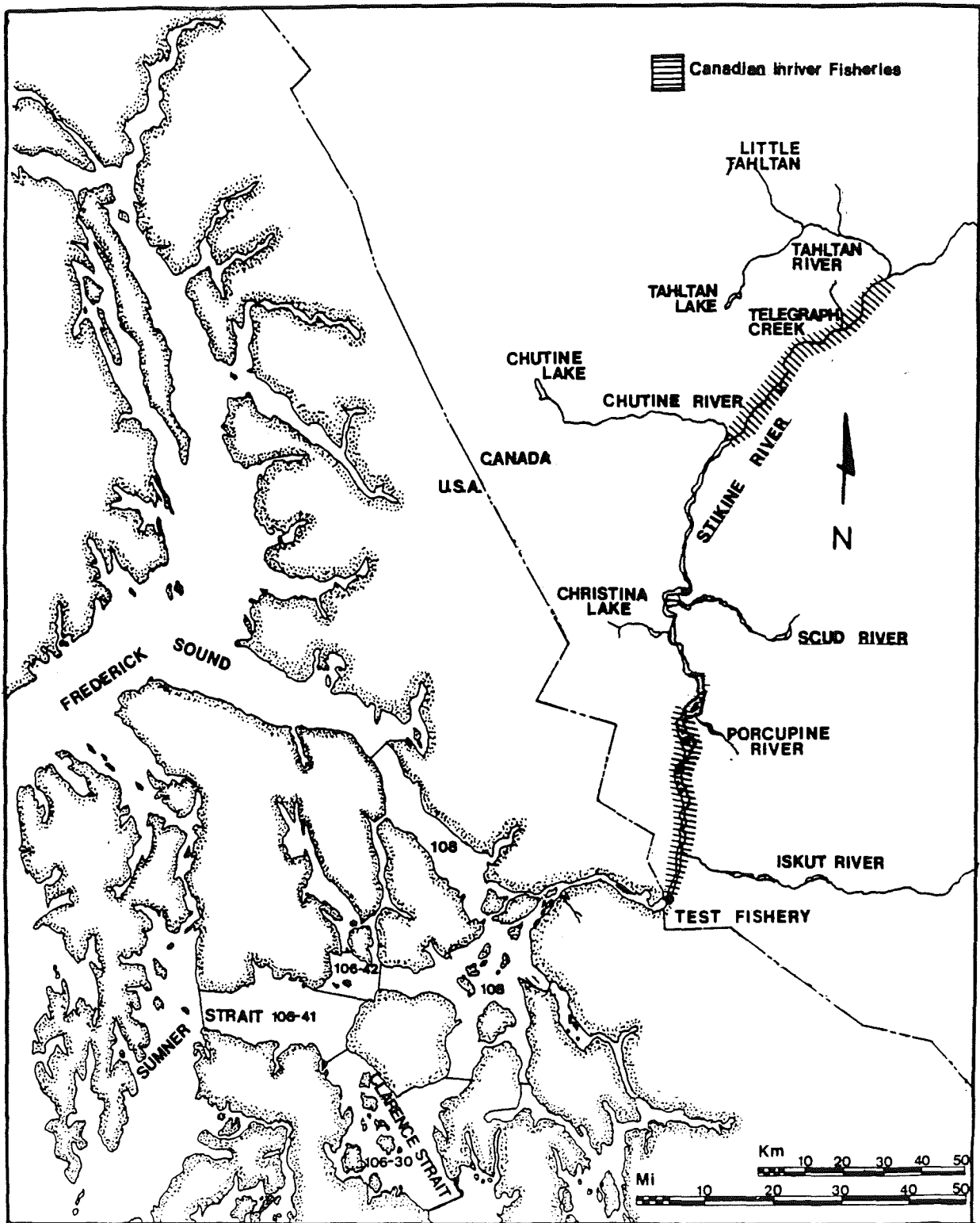


Figure 1. Location of principal U.S. and Canadian fishing areas where Stikine River salmon stocks are caught.

and commercial fishery catches. Pink salmon are occasionally a consideration in District 108 beginning in July. Pink salmon run strength assessments are based upon escapement surveys and CPUE in the test and commercial fisheries. Beginning in mid-June and occasionally extending to early August, sockeye runs in U.S. systems are a management consideration. The assessments of the strength of these runs are based upon commercial and test fishery CPUE, weir counts, and historical stock composition data. Beginning in mid-July, pink salmon run strength may be a management consideration in the District 106 fishery. Assessment of pink run strength is based upon the predicted return, CPUE, and total catches in the commercial and test fisheries. Availability of pink and chum salmon in District 106 and District 108 is expected to be slightly above average in 1992.

Troll fishery regulations for 1993 are different from those in effect in 1992. The Alaska Department of Fish and Game has set a catch limit of 10,000 non-Alaska hatchery-origin chinook salmon for the months of May and June. In contrast to 1992, no region-wide chinook hatchery access fishery will occur during June and experimental fisheries will occur two days per week in confined areas close to the hatchery release sites. Two experimental areas will be open in Frederick Sound initially on May 24 and 25 at Cape Fanshaw and Big Creek, and in Frederick Sound at Beacon Point, in Sumner Strait at Baht Harbor, in Clarence Strait at Snow Passage and in Stikine Strait at Steamer Point on June 1 and 2. The general summer troll season will open on July 1 and will close on July 6 for the taking of chinook salmon. The season will reopen on July 12 for the harvest of salmon species other than chinook.

Canada: The Canadian lower Stikine River commercial fishery (Figure 1) will be managed on a weekly basis with management actions driven by results of stock, catch and escapement projections derived from the Stikine Management Model. Weekly inputs to the model will include: stock identification data applied to catches in Alaskan Districts 106 and 108 and in the Canadian lower river gillnet fishery; CPUE data from targeting fisheries; catch data; and escapement requirements. Consideration for Tahltan Lake sockeye stock management objectives should persist from the fishery opening June 29 to the end of July. Thereafter, the management attention will be focused primarily on non-Tahltan stock objectives.

The achievement of escapement objectives is the foremost priority in management considerations. Inriver allocation priority will be to fulfill the requirements of the traditional Indian food fishery. The commercial fisheries, therefore, will be managed to accommodate these fundamental priorities. The area of most intense management will be within the lower Stikine commercial fishery.

Fishing time in the lower Stikine fishery will depend upon stock assessment and international and domestic catch allocation considerations. Normal fishing periods of two to three days per week will be adjusted accordingly. Traditional gear limitations of one net per fisherman with a maximum length of 135 meters will be in effect. Fishing boundaries will remain unchanged from those established in previous years, i.e., from the international border upstream to boundary markers located near the Stikine-Porcupine confluence, and in the Iskut River to a marker located approximately 2 km. upstream from the mouth. In the upper Stikine commercial fishery, one day of fishing will be permitted each week subject to evaluations of run strength. As in past years, weekly fishing times in the Indian food fishery will not normally be restricted.

Restrictive management responses that could be used to reduce the sockeye harvest in the lower Stikine commercial fishery, in order of implementation, include: reducing fishing time, the major tool used in the regulation of the fishery; and, reducing the fishing area by relocating boundaries to protect isolated spawning populations. In the Indian food fishery, reductions in fishing time would be considered if no other adjustments could be made in the lower and upper river commercial fisheries. Conservation measures for the protection of chinook salmon in the lower river commercial fishery include a maximum mesh size of less than 146 mm (5¾) through mid-July.

In the event that a more liberal management regime is justified, extensions to fishing time in the commercial fisheries for up to 24 hours would be granted. Additional fishing time beyond this would be dependent on stock escapement and catch considerations.

Summary: Attainment of escapement goals for the Tahltan and non-Tahltan portions of the run is the primary objective of Stikine sockeye management. Harvest sharing will be based upon the TAC projections derived from the model. The TAC estimates will likely change from week to week as the Stikine Management Model forecasts a new total run size from the cumulative CPUE each week. Variations in the TAC estimate will likely be larger early in the season, when CPUE is high, than later in the season. Management actions will reflect these week to week changes in the TAC estimates. Fishery managers from both countries will keep in weekly contact in order to evaluate the output from the Stikine Management Model and the outcome of their respective management actions.

Inseason Data Exchange and Review

Canada and the U.S. will conduct data exchanges by telephone on Wednesday afternoon or Thursday morning of each week during the fishing season. At that time, current catch statistics and stock assessment data will be updated, exchanged, and reviewed. Management plans for the next week for each country will be discussed at this time. It is anticipated that additional communications will be required each week. Weekly decision deadlines will be: a) for Districts 106 and 108: 11:00 a.m., Thursday, Alaska Daylight Time; and, b) for the Canadian Stikine fishery: 10:00 a.m., Friday, Pacific Daylight Time. A final weekly summary of the fisheries will be conducted Friday afternoon through a conference call between management offices of DFO and ADF&G.

Stock Assessment Program

This section summarizes agreements regarding the data which will be collected by each National Section and, when appropriate, procedures that will be used for analysis.

Catch Statistics: The U.S. shall report catches and effort in the following strata for each statistical week:

1. Subdistricts 106-41&42 (Sumner Strait);

2. Subdistrict 106-30 (Clarence Strait); and
3. District 108.

Canada shall report catch and effort statistics in the following strata for each statistical week:

1. the lower river commercial fishery;
2. the upper river commercial fishery;
3. the Indian food fishery; and
4. the lower Stikine River test fishery conducted near the international border.

Age Composition of Sockeye in Catches: Scales will be collected and used to age fish. Associated fish length and sex composition data will also be collected. The U.S. shall provide scale samples from Subdistricts 106-41&42, Subdistrict 106-30 and District 108 for each fishing week. Canada shall provide scale samples, matched with length and egg diameter data, collected from the lower river commercial fishery each week. Scale samples will not be collected from the upper river commercial and subsistence fisheries. Instead, samples collected at the Tahltan Lake weir will be used to characterize the age composition of catches of sockeye salmon in the upper river. Sockeye salmon caught in the lower Stikine River test fishery will be sampled for scales and for egg diameter, sex, and length data. Scale impressions will be available to ADF&G.

Stock Composition of Alaska Catches: In contrast to recent years, an inseason SPA program will not be used in 1993 to estimate the contribution of Stikine River stocks in Districts 106 and 108. Inseason SPA was terminated because stock composition estimates generated with this program were judged to be unreliable in some years. Analysis of available data suggests that, for the 1986 to 1992 period, average historical SPA postseason estimates would generally have been closer to annual SPA postseason estimates than inseason estimates were.

During the 1993 season, stock composition estimates of Subdistrict 106-41&42, Subdistrict 106-30, and District 108 sockeye catches will be based on historical average weekly estimates. For Subdistricts 106-41&42 and 106-30 the following estimates will be used: 1) if the Stikine Management Model forecast of run size in the previous week is <90,000, the average weekly stock composition estimates from 1986-1990 will be used; 2) if the run forecast in the previous week falls in the range of 90,000 to 154,999, the 1986-1992 average will be used; and 3) if the run forecast in the previous week is 155,000 or greater, the 1991-1992 average will be used. For District 108, the 1986-1992 average weekly stock composition estimates will be used to estimate catches of Stikine sockeye.

After the fishing season, SPA will be used to recalculate actual contributions of Tahltan Lake and non-Tahltan sockeye stocks to the catches made each week in each subsection of District 106 (Clarence Strait and Sumner Strait) and District 108. The desired sample size from each of these strata is 600 fish per week. It is recognized that small catches in District 108, similar to previous years, may preclude temporal stratification at the desired level. A test fishery will be conducted in Frederick Sound beginning in statistical week 25. When a commercial fishery does not operate, stock composition estimates will be made using samples collected from the test fishery. In District 106, when a commercial fishery does not operate, a test fishery will be instituted for scale sample collection and abundance estimation.

An independent method of calculating the harvest of Tahltan Lake fish in District 108 will be conducted in 1993. Otoliths sampled from the District 108 catch of sockeye salmon will be analyzed for presence or absence of thermal otolith marks applied to Tahltan Lake fry during their incubation period at the Snettisham Central Incubation Facility. Estimates of the contribution of these enhanced fish to the weekly harvest will be made. Estimates of the harvest of wild fish destined for Tahltan Lake may be able to be determined by multiplying the estimates of enhanced stock contributions by the ratio of wild to enhanced fish on the Tahltan Lake spawning grounds.

Stock Composition of the Inriver Canadian Catch: Egg diameter data will be used to estimate the Tahltan Lake versus non-Tahltan contribution to the sockeye catches during the fishing season. This will also be the data used postseasonally. Egg diameters will be measured from a desired sample size of 100 female sockeye salmon each week to determine stock composition; a total of 350 sockeye salmon will be randomly sampled each week for scales and sex. It is necessary to match the scale and egg data by fish to develop postseason stock-specific age composition estimates and for the development of postseason scale pattern standards.

Stock Composition and Run Timing in the Canadian Test Fishery: The proportion of Tahltan Lake and non-Tahltan lake sockeye salmon in test net catches in the lower Stikine River will be estimated inseason based on egg diameter data. Canada shall sample all fish for scales and all females for egg diameter (data to be matched with scale samples). The postseason estimate will be based on the egg diameter data.

Spawning Escapement Estimates: An adult enumeration weir will be used to determine the Tahltan Lake sockeye escapement. The age composition will be estimated from scale samples. Approximately 800 fish will be sampled during the season for scales, length, and sex. The non-Tahltan escapement will be estimated using migratory timing information obtained from CPUE data from the drift test fishery located near the international border combined with weekly stock compositions estimated from the combined drift and set net test fishery catches.

Postseason SPA standards: Scale pattern standards for Tahltan and non-Tahltan Lake sockeye stocks will be made from scale samples collected inriver. For the Tahltan Lake stock, samples will be taken from both male and female sockeye at the Tahltan Lake weir, and from female sockeye caught in the lower river fisheries having small-diameter eggs. For the non-Tahltan stock, samples will be taken from female sockeye caught in the lower river fisheries having large-diameter eggs. Standards for classifying marine catches will therefore be developed from scale samples collected from the Tahltan Lake weir and from both the commercial and test fishery catches in Canada.

Since the weekly proportion of Tahltan to non-Tahltan sockeye salmon in the test fishery is used postseasonally to determine the proportion of these two stocks in both the entire run and the mainstem escapement, it is important to get the best estimate possible. It is agreed that egg diameters will be used to determine stock proportions in the test fishery catches for both inseason and postseason analyses.

Data Evaluation Procedures

Historical Database: Although Canadian commercial fishing began in the Stikine River in 1975, the methodology for estimating sockeye run sizes was not well standardized until 1982. Therefore, estimates of run size after this time are considered to be better than those made prior to 1982. The historical database from 1982 to 1992, used as input to the Stikine Management Model for 1993 is presented in Tables 1 to 3. The 1993 run size estimated by the model at the end of the fishing season will be updated in the fall of 1993 using postseason stock composition data for use in the database in future years.

Stikine Management Model: A model based on the linear relationship between CPUE and run size has been in use since 1988. The model is updated annually using the most current data to make weekly inseason predictions of the total run and the total allowable catch (TAC). A description of the original model is given in the TRTC Report: **TCTR (88)-2, Salmon Management Plan for the Transboundary Rivers, 1988**. The purpose of the model is to aid managers in making weekly harvest decisions to meet U.S./Canada treaty obligations for harvest sharing and conservation of Stikine River sockeye salmon.

The model for 1993 is based on eleven years of historical CPUE data from District 106 and ten years from the Canadian commercial fishery in the lower river. (There was no commercial fishing inriver in 1984.) A FORTRAN program is used to determine the coefficients of the linear model of run size regressed on cumulative CPUE for each week of the fisheries beginning in week 26 for the District 106 fishery and week 27 for the lower river fishery. The parameters from the linear regressions are presented in Table 4. In the past, two sets of CPUE data have been used to predict the total run. These included:

1. the District 106 cumulative CPUE of Stikine sockeye stocks which is used to predict the total run of Stikine River sockeye; and
2. the cumulative CPUE from the Canadian lower river commercial fishery which is used to predict the inriver Stikine River sockeye run. The total run is then determined as the inriver run plus the projected Stikine River sockeye catch in District 108 plus the catch of Stikine River sockeye salmon in District 106, which is assumed to be 10% of the total run.

As in 1991 and 1992, the 1993 inseason model predictions will be based on the second method as described above. The reason for this is that weekly regressions of CPUE on total run using the inriver data usually have higher coefficients of correlation compared to those based on the District 106 CPUE data for corresponding weeks (Table 4). Predictions from the District 106 data will continue to be made to verify inseason estimates and provide postseason comparisons.

The TAC of Stikine sockeye salmon for the 1993 season will be determined each week from run size estimates according to the following schedule:

1. weeks 26 and 27 (6/20-7/03): the preseason forecast of run size of 135,000 will be used;

2. weeks 28 and after (7/04-end of season): an estimate of run size will be determined each week from the cumulative CPUE of sockeye salmon in the lower river commercial fishery, and projected District 106 and 108 catches.

Separate projections of run size will be made for the Tahltan Lake stock and for the entire Stikine sockeye run. This information is used inseason to help monitor the run of the Tahltan stock and will be used postseasonally to help evaluate the performance of the model.

The estimates of TAC made each week after statistical week 27 will be based on CPUE data from the lower Stikine commercial fishery. In the event that the commercial fishery is closed for a given week, the CPUE data from the lower Stikine test fishery will be used. In this case, the average test fishery CPUE from Monday through Wednesday will be used.

The part of the model which determines total and weekly TAC levels for the U.S. and Canadian fisheries is included in the Lotus worksheet for use by managers inseason. This part of the model uses the coefficients from the linear regression model, the established escapement goals, and Annex provisions of harvest sharing to determine the total TAC for each country. Weekly estimates of TAC and effort are provided as guidelines for the managers. Those for District 106 and the inriver commercial fishery are derived from the 1982-1992 average run timing of the stocks and the corresponding average CPUE levels of each fishery. Those for District 108 are derived from the average run timing of the stocks from 1969-1992 for those years in which the fishery was operated for most of the weeks between 26 and 35 (e.g., 1969-1973, 1980, 1982, 1986, and 1989-1992).

Inseason Use: For 1993, the model predictions will set the TAC levels and give guidelines for effort needed to obtain the TAC distributing it according to the fraction of the run occurring each week. However, managers may use additional information on which to make decisions on the openings of their respective fisheries each week. They will evaluate the output of the model and look for discrepancies with other information they may have on run strength. The information and evaluation will be used to improve the model for the next year.

Output from the model is arranged in 11 tables, the first four are for the total Stikine sockeye stock, the next four are for the Tahltan stock, and the last three are for the non-Tahltan stock group. Estimates for the non-Tahltan stock are the total stock estimate minus the Tahltan stock estimate, since regression models based on the non-Tahltan stock estimates of catch are poor.

The first, fifth, and ninth tables from the spreadsheet output give the forecasts for inriver run size, the total run size based on the inriver run size, the total run size based on District 106-41 CPUE, and the run size estimate used by the model to determine the total allowable catch (TAC), the total TAC, the U.S. and Canadian shares of the TAC, and, finally, the resultant escapement if the full TAC is taken. The second, sixth, and tenth tables give cumulative catches in each of the Canadian and U.S. fisheries. The third, fourth, seventh, eighth, and eleventh tables give guidelines for weekly fishing patterns that would distribute the catch throughout the season based on historical patterns of run timing and cpue. The fisheries managers are in no way obligated to follow these guidelines. There may be other independent reasons (e.g., protect other species) to increase or reduce fishing pressure in any given week.

In the model output tables, 'Season TAC' refers to the total fishing season TAC as estimated each week from the estimated run size. 'Weekly TAC' is calculated by first subtracting the cumulative catch to date from the Season TAC and then apportioning the remaining TAC among the remaining weeks of the fishing season based on run timing proportions. 'Weekly effort' is calculated using historical patterns of CPUE in the various fisheries. In the third and seventh tables, District 106 weekly TAC and effort assume all the Stikine catch is taken in that District'; the 'Season Surplus TAC' assumes a catch in District 106 equal to 10% of the predicted run size (i.e., normal fishing patterns, not targeting Stikine stocks); and the weekly TAC and effort for District 108 assumes all TAC above the 10% of run taken in District 106 will be taken in District 108. A new column has been added to the third and seventh tables in 1993 giving the percent of the predicted run size that has been caught in District 106 to date.

Postseason Evaluation: After the fishing season is over, the TRTC will evaluate how well the model performed in predicting the entire run, where discrepancies occurred, and what might have caused them. The committee will also determine whether escapement goals were met according to the Spawning Escapement Goals section of this report. This information is presented in the annual catch and escapement reports prepared by the committee. For 1992, the preliminary evaluation may be found in: **Preliminary Estimates of Transboundary River Salmon Production, Harvest, and Escapement and a Review of Joint Enhancement Activities, 1992**, Transboundary Technical Committee, December, 1992¹. The summarized output of the Stikine Management Model during the 1992 fishing season is presented in Table 5. The inseason analyses under-estimated the U.S. marine catch of Stikine origin sockeye due to problems in distinguishing Stikine River and Alaskan stocks. This was corrected postseason with the use of current-year standards for stock identification.

Coho Salmon

Preseason Forecast

The lack of information on the brood escapement or smolt production precludes specific numerical forecasts. A qualitative prediction of the 1993 run is that it will be of average magnitude based on the catches in the coho test fishery in the two principal brood years, 1989 and 1990. The return of 4-year-olds is expected to be above average; whereas, the return of 3-year-olds should be below average.

Escapement Goal

The interim escapement goal for Stikine River coho salmon is 30,000 to 50,000.

¹ This report will be finalized in the winter of 1993/94 and published in the PSC series.

Harvest Sharing Objectives

According to the PSC fishing agreement for 1993, Canada is permitted to catch a maximum of 4,000 Stikine coho salmon.

Stock Assessment Program

Each country shall:

1. report catch statistics for the same strata as sockeye salmon are reported;
2. sample its fisheries for coded-wire tags; and
3. conduct escapement programs as resources permit.

Management Procedures

United States: If there is a conservation concern, the District 108 fishery will be restricted.

Canada: If there is a conservation concern, the Canadian fishery will be restricted. The Canadian harvest allocation of 4,000 coho, as specified in the Annex IV of the Pacific Salmon Treaty, will be the basic management guide in the inriver fishery.

Chinook Salmon

Preseason Forecast

The escapement through the Little Tahltan River chinook weir was about average in 1987 (4,783 counted) and a record high in 1988 (7,292 counted); 1987 and 1988 are the principal brood years of the 1993 run. For comparison, the 1985 to 1992 average weir count is 4,789 chinook. Overall, an above average run size is expected in 1993. However, it should be noted that uncertainty over the historical total stock size, due to a lack of marine harvest data and total inriver spawning estimates, makes it difficult to relate the expected return with previous years.

Escapement Goal

The TRTC recently revised the interim escapement goal range for Stikine River chinook salmon to make it more relevant to the current index escapement monitoring system. The former goal of 19,800 to 25,000 chinook salmon was a system-wide goal. Unfortunately, there is not an annual program to estimate the system-wide escapement. There is, however, an annual index escapement monitoring program using an enumeration weir on the Little Tahltan River. Therefore, it seemed more appropriate to express the goal in terms of the Little Tahltan River

chinook count, for which annual data is collected, than in terms of a total system escapement which requires a number of unquantified and variable assumptions to be made in order to arrive at an annual estimate.

The new interim index escapement goal is 5,300 chinook salmon (excluding jack chinook) through the Little Tahltan River weir. Management systems have not yet evolved to actively target chinook escapement goals, although both countries have adopted conservative management plans with respect to chinook salmon to enable stocks to rebuild by 1995.

Harvest Sharing Objectives

According to the PSC agreement for 1993, Canada is allowed to harvest Stikine chinook salmon as an incidental harvest in the directed fishery for sockeye and coho salmon. Both Parties are to take appropriate management actions to ensure that escapement goals for chinook salmon bound for the Canadian portions of the Stikine River are achieved by 1995.

Management Procedures

United States: Initial openings in District 108 will be restricted to the outer areas of the district in order to minimize the interception of adult chinook salmon. Chinook salmon catches will also be a management concern in District 106 throughout the season and, if large numbers of small feeder chinook are caught, night closures will be instituted.

Canada: Chinook will be harvested in the commercial fisheries incidentally during the early sockeye fishery. Mesh size restrictions (maximum 146 mm) will be in effect through mid-July to conserve chinook salmon.

Stock Assessment Program

Each country shall:

1. report catch statistics for the same strata as sockeye salmon are reported;
2. sample its fisheries for coded-wire tags; and
3. conduct escapement programs as resources permit.

Table 1. Stikine River sockeye run sizes, 1979-1992.

Inriver run size estimates				Inriver Catch	Escapement	Marine Catch ^{a/}	Total Run
Year	Canada	U.S.	Average				
All Stikine Sockeye							
1979		40,353	40,353	13,534	26,819	8,299	48,652
1980		62,743	62,743	20,919	41,824	23,206	85,949
1981		140,029	140,029	27,624	112,405	27,538	167,567
1982		68,761	68,761	20,540	48,221	43,329	112,090
1983	77,260	66,838	71,683	21,120	50,563	5,810	77,493
1984	95,454	59,168	76,211	5,327	70,884	7,928	84,139
1985	237,261	138,498	184,747	26,804	157,943	29,747	214,494
1986			69,036	17,846	51,190	6,420	75,456
1987			39,264	11,284	27,981	4,077	43,342
1988			41,915	16,538	25,377	3,181	45,096
1989			75,054	21,639	53,415	15,335	90,389
1990			57,386	19,964	37,422	9,856	67,242
1991			120,152	25,138	95,014	34,320	154,472
Averages							
1979 - 1991			80,564	19,098	61,466	16,850	97,414
1982 - 1991			80,421	18,620	61,801	16,000	96,421
1992			154,255	29,239	125,016	86,609	240,864
=====							
Tahltan Sockeye Stock							
1979			17,472	7,261	10,211	5,076	22,548
1980			19,137	8,119	11,018	11,239	30,376
1981			66,514	15,724	50,790	16,189	82,703
1982			42,493	14,236	28,257	24,785	67,278
1983			32,684	11,428	21,256	5,104	37,788
1984			37,571	4,794	32,777	3,251	40,822
1985			86,008	18,682	67,326	25,197	111,205
1986			31,015	10,734	20,280	2,757	33,771
1987			11,923	4,965	6,958	2,255	14,178
1988			7,222	4,686	2,536	2,129	9,351
1989			14,110	5,794	8,316	1,561	15,671
1990			23,923	8,996	14,927	2,307	26,230
1991			67,394	17,259	50,135	23,609	91,003
Averages							
1979 - 1991			35,190	10,206	24,984	9,651	44,840
1982 - 1991			35,434	10,157	25,277	9,296	44,730
1992			76,538	16,631	59,907	42,715	119,253

^{a/} The marine catch includes test fishery catches.

Table 2. CPUE for all sockeye salmon and the proportion of Tahltan stock in the catch from the Canadian lower Stikine River commercial fishery from 1982 to 1992. For periods when the fishery was closed, values were filled in with averaging and interpolation techniques (these values are underlined in the table). For the 1993 regressions of total run on cumulative CPUE, the cumulative CPUE started with week 27, the week the fishery opens in 1993.

CPUE of all Sockeye Salmon in Catch										
Week	1992	1991	1990	1989	1988	1987	1986	1985	1983	1982
26	39.9	14.8	13.0	25.5	3.0	3.0	2.8	67.6	12.8	13.3
27	111.1	120.3	49.6	48.1	21.8	11.9	18.8	75.0	39.3	49.5
28	154.9	121.0	78.6	23.1	35.5	10.6	79.8	100.1	62.2	46.9
29	144.0	114.4	110.3	105.5	69.2	57.9	58.1	260.0	72.8	24.0
30	166.0	53.7	81.4	140.8	71.9	67.8	84.7	147.9	53.3	29.1
31	88.3	83.8	62.1	73.9	61.9	27.6	81.9	104.7	92.0	13.6
32	73.2	31.6	54.4	60.8	89.2	76.6	55.6	73.6	64.3	20.5
33	43.2	15.7	16.2	28.4	33.3	32.3	34.1	58.6	54.7	7.7
34	12.5	1.0	12.4	16.4	23.1	16.5	25.9	18.2	14.7	3.6
35	4.5	4.2	13.1	6.2	11.0	5.4	9.4	10.3	11.9	1.3
Proportion Tahltan Stock in Catch										
Week	1992	1991	1990	1989	1988	1987	1986	1985	1983	1982
26	0.87	0.80	0.73	0.65	0.77	0.74	0.73	0.89	0.83	0.93
27	0.87	0.83	0.80	0.49	0.77	0.74	0.77	0.90	0.86	0.93
28	0.78	0.86	0.69	0.38	0.69	0.88	0.83	0.90	0.83	0.89
29	0.55	0.75	0.35	0.21	0.42	0.66	0.73	0.79	0.62	0.67
30	0.24	0.37	0.25	0.03	0.27	0.24	0.52	0.42	0.48	0.42
31	0.26	0.12	0.06	0.02	0.10	0.11	0.19	0.29	0.24	0.16
32	0.09	0.08	0.03	0.02	0.04	0.05	0.09	0.20	0.14	0.20
33	0.02	0.00	0.03	0.00	0.07	0.04	0.02	0.20	0.11	0.21
34	0.00	0.00	0.03	0.00	0.09	0.07	0.01	0.20	0.09	0.21
35	0.00	0.08	0.01	0.00	0.00	0.08	0.00	0.20	0.02	0.21

Table 3. CPUE of all sockeye salmon and the proportion of Stikine River Tahltan and non-Tahltan stocks in the catch from the U.S. District 106-41/42 commercial fishery from 1982 to 1992. For periods when the fishery was closed, values were estimated using averaging and interpolation techniques (these values are underlined in the table). For the 1993 regressions of total run on cumulative CPUE, the cumulative CPUE started with week 26, the week the fishery opens in 1993.

CPUE of all Sockeye Salmon in Catch											
Week	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982
25	39.5	51.4	29.2	46.8	16.5	19.3	14.1	91.0	45.3	38.2	101.9
26	56.1	117.0	33.6	51.9	22.9	29.1	16.9	126.9	69.6	57.7	119.1
27	110.2	52.9	78.2	66.1	58.7	52.2	63.0	162.9	89.4	38.6	124.9
28	108.8	90.8	84.5	147.1	66.8	103.9	75.5	117.4	80.9	65.9	156.9
29	110.1	87.5	116.1	109.4	103.6	83.9	88.0	113.3	79.7	76.1	160.5
30	97.9	95.5	176.9	89.4	87.6	155.9	100.6	108.7	148.3	69.9	164.1
31	70.1	100.7	78.4	93.4	59.3	106.6	105.8	189.1	53.0	44.4	137.3
32	59.6	52.7	45.1	36.2	92.2	115.4	82.1	69.0	45.6	40.5	95.2
33	41.0	24.7	30.6	33.5	67.7	88.3	60.1	100.5	14.9	18.2	53.1
34	21.3	12.9	12.6	7.7	20.5	45.9	28.8	37.8	5.4	6.2	11.1
35	15.8	8.4	4.2	2.9	11.0	3.4	8.9	5.9	1.1	5.7	4.4
Proportion Tahltan Stock in Catch											
Week	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982
25	0.27	0.23	0.02	0.03	0.04	0.04	0.00	0.10	0.07	0.04	0.01
26	0.50	0.40	0.03	0.09	0.09	0.01	0.02	0.11	0.08	0.10	0.15
27	0.25	0.26	0.03	0.03	0.07	0.01	0.09	0.35	0.11	0.19	0.11
28	0.17	0.10	0.01	0.00	0.05	0.05	0.11	0.24	0.11	0.12	0.19
29	0.05	0.01	0.01	0.00	0.01	0.01	0.06	0.13	0.02	0.08	0.17
30	0.00	0.10	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.13	0.06
31	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.02	0.08
32	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
33	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
Proportion Non-Tahltan Stock in Catch											
Week	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982
25	0.08	0.09	0.06	0.06	0.00	0.00	0.00	0.00	0.01	0.01	0.01
26	0.09	0.02	0.02	0.10	0.00	0.00	0.00	0.03	0.05	0.02	0.03
27	0.08	0.03	0.02	0.16	0.00	0.00	0.03	0.01	0.04	0.01	0.02
28	0.11	0.01	0.02	0.05	0.00	0.00	0.02	0.01	0.01	0.01	0.08
29	0.00	0.09	0.01	0.01	0.00	0.00	0.04	0.01	0.13	0.06	0.09
30	0.14	0.03	0.01	0.00	0.00	0.02	0.01	0.03	0.02	0.01	0.17
31	0.14	0.05	0.04	0.02	0.00	0.00	0.00	0.00	0.03	0.00	0.09
32	0.20	0.01	0.05	0.01	0.01	0.00	0.00	0.00	0.02	0.03	0.00
33	0.20	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.04	0.03	0.00
34	0.20	0.00	0.02	0.01	0.00	0.00	0.00	0.04	0.04	0.00	0.00
35	0.20	0.01	0.02	0.01	0.00	0.00	0.00	0.05	0.04	0.02	0.00

Table 4. Model parameters from the linear regression of run size on cumulative CPUE for the 1993 Stikine Management Model.
(Due to rounding, the run fraction column may not total 1.0).

Canadian lower river commercial fishery catch of sockeye salmon								
WEEK	R ²	RUN F.	INTERCEPT	SLOPE	SD(R.F.)	SD(INT)	SD(SLOPE)	AVG.CPUE
27	0.61	0.11	32566.11	1020.57	0.073	18913.91	291.25	54.54
28	0.66	0.14	25109.61	501.69	0.071	18680.6	127.62	71.27
29	0.89	0.19	6516.07	359.29	0.054	11739.19	45.56	101.61
30	0.87	0.18	-1878.63	284.18	0.052	13545.25	38.53	89.65
31	0.85	0.14	-7245.06	247.30	0.039	15351.3	36.30	68.98
32	0.81	0.13	-16296.8	234.34	0.059	19329.13	40.27	59.98
33	0.80	0.07	-17873.0	221.76	0.030	20143.24	39.23	32.40
34	0.78	0.03	-19306.0	218.18	0.019	21599.68	40.97	14.42
35	0.77	0.02	-19741.3	215.68	0.009	22371.86	41.84	7.72
Canadian lower river commercial fishery catch of Tahltan sockeye salmon								
WEEK	R ²	RUN F.	INTERCEPT	SLOPE	SD(R.F.)	SD(INT)	SD(SLOPE)	AVG.CPUE
27	0.77	0.22	6351.21	734.49	0.109	7842.37	142.42	44.90
28	0.84	0.26	1568.35	371.80	0.087	6849.15	56.55	56.66
29	0.93	0.28	93.21	242.86	0.102	4528.75	23.43	60.00
30	0.92	0.14	-1116.00	214.75	0.055	5122.05	22.99	26.78
31	0.91	0.05	-818.16	200.54	0.029	5345.69	22.55	11.87
32	0.91	0.03	-926.45	195.95	0.013	5434.65	22.37	5.24
33	0.90	0.01	-699.82	192.49	0.011	5559.65	22.59	2.52
34	0.90	0.00	-703.69	191.64	0.007	5630.85	22.78	0.94
35	0.90	0.00	-651.35	191.06	0.002	5647.65	22.81	0.36
District 106-41 fishery catch of Stikine River sockeye salmon								
WEEK	R ²	RUN F.	INTERCEPT	SLOPE	SD(R.F.)	SD(INT)	SD(SLOPE)	AVG.CPUE
26	0.70	0.17	55090.57	4434.86	0.132	16499.93	964.01	12.28
27	0.95	0.22	42837.71	2441.60	0.114	7120.58	191.69	15.05
28	0.86	0.24	41173.65	1645.47	0.106	12104.93	221.28	14.23
29	0.69	0.13	47018.92	1226.03	0.089	18357.98	276.07	9.45
30	0.57	0.11	54077.68	950.97	0.098	21128.95	274.60	7.33
31	0.51	0.06	58180.75	821.01	0.062	22202.39	266.28	4.24
32	0.54	0.04	55918.93	830.36	0.047	21673.71	253.38	2.02
33	0.57	0.02	54482.98	833.95	0.017	21061.27	241.10	1.44
34	0.58	0.00	54020.87	833.40	0.008	20713.91	234.73	0.60
35	0.59	0.00	53801.26	832.29	0.006	20501.66	230.86	0.35
District 106-41 fishery catch of Tahltan sockeye salmon								
WEEK	R ²	RUN F.	INTERCEPT	SLOPE	SD(R.F.)	SD(INT)	SD(SLOPE)	AVG.CPUE
26	0.74	0.25	21534.28	2978.89	0.217	8815.12	595.20	10.06
27	0.93	0.29	15045.86	1602.84	0.142	4572.56	142.11	12.69
28	0.84	0.25	13713.61	1167.57	0.168	7500.31	171.01	9.62
29	0.73	0.11	16728.80	918.89	0.086	9712.27	188.44	5.48
30	0.69	0.06	16581.27	867.33	0.074	10383.51	191.59	2.42
31	0.65	0.03	17823.02	806.27	0.054	11047.56	196.04	1.51
32	0.65	0.00	17552.08	804.79	0.027	11141.26	196.62	0.41
33	0.66	0.00	17167.85	806.05	0.016	11087.15	194.35	0.41
34	0.66	0.00	17155.08	805.79	0.002	11098.41	194.48	0.03
35	0.66	0.00	17147.69	805.64	0.001	11105.14	194.55	0.02

Table 5. Weekly forecasts of run size and total allowable catch for Stikine River sockeye salmon as determined inseason by the Stikine Management Model, 1992. From Table 1 of the TRTC report: "Preliminary estimates of transboundary river salmon production harvest and escapement and a review of joint enhancement activities, 1992;" with postseason estimates added.

		Forecasts		U.S. Fishing Regime			Canada	
Week	Start Date	Run	Size	TAC	6 8	TAC	TAC	U.S.
Model Runs Generated by the U.S.								
26	21-Jun	127,338	67,338	I D	37,338	30,000	5,917	0
27	28-Jun	127,338	67,338	I D	37,338	30,000	18,294	1,111
28	05-Jul	151,772	91,772	I D	61,772	30,000	37,481	1,811
29	12-Jul	169,019	109,019	I D	79,019	30,000	47,455	10,272
30	19-Jul	194,678	134,678	I D	104,678	30,000	67,201	16,630
31	26-Jul	221,358	161,358	I D	131,358	30,000	76,243	20,758
32	02-Aug	208,343	148,343	I D	118,343	30,000	82,055	25,541
33	09-Aug	213,846	153,846	I D	123,846	30,000	82,055	25,541
postseason estimate		240,864	180,864		150,864	30,000	85,420	26,281
Model Runs Generated by Canada								
26	21-Jun	127,338	67,338	I D	37,338	30,000	9,937	0
27	28-Jun	127,388	67,338	I D	37,388	30,000	20,337	1,121
28	05-Jul	166,588	106,588	I D	76,588	30,000	37,481	7,445
29	12-Jul	202,620	142,620	I D	112,620	30,000	47,167	11,293
30	19-Jul	192,463	132,463	I D	102,463	30,000	73,345	17,567
31	26-Jul	229,284	169,284	I D	139,284	30,000	75,814	20,642
32	02-Aug	207,257	147,257	I D	117,257	30,000	82,055	24,497
33	09-Aug	213,873	153,873	I D	123,873	30,000	82,862	25,083
34	16-Aug	216,484	156,484	I D	126,484	30,000	82,862	26,051
35	23-Aug	214,100	154,100	I D	124,100	30,000	82,862	25,158
Final inseason		225,125	165,125		135,125	30,000	84,833	26,262
postseason estimate		240,864	180,864		150,864	30,000	85,420	26,281
I = Indicates indirect fishery allowed; D = Indicates directed fishery allowed.								

TAKU RIVER

Preseason Forecasts

Compared to the recent five-year cycle run sizes, an average to below average run of sockeye to the Taku River is expected in 1993. The escapement in 1988, which should be the major contributing brood year to the 1993 run, was estimated from mark-recapture data to be approximately 74,100 fish, 30% below the 1988-1992 cycle average of 105,100 sockeye. The escapement in 1989, from which the four-year-old component in 1993 will originate, was 95,300 sockeye, 9% below average. However, both the 1988 and 1989 escapements were either within, or exceeded, the interim escapement goal of 71,000 to 80,000 sockeye salmon. Below average returns are expected for Little Trapper Lake and Tatsamenie stocks based on below average escapements in 1988 and 1989.

The 1993 coho run to the Taku River is expected to be about average. Coho escapements into Canada in 1989 and 1990 were estimated to be 56,808 and 71,284 fish, respectively. The average for the period 1987 to 1992 is approximately 73,000 coho salmon. Both brood year escapement estimates exceeded the interim escapement goal of 27,500 to 35,000 fish. Coho returns in Southeast Alaska in 1991 and 1992 have benefitted from outstanding marine survivals.

An above average Taku chinook run is expected in 1993 based on above average index escapements recorded in 1988 (index count of 8,626 chinook salmon) and 1989 (index count of 9,480 chinook salmon). The return of 6-year olds is expected to be below average reflecting the below average escapement index count in 1987 of 5,743 chinook. The recent average (1983 to 1992) index count is 7,801 chinook salmon. The Taku chinook escapement index is the combined peak aerial count of chinook in six tributaries throughout the drainage including the Nakina, Nahlin, Tatsamenie, Kowatua, and Dudidontu rivers and Tseta Creek. The interim index escapement goal is 13,200 chinook salmon.

Odd-year returns of Taku River pink salmon are larger than even-year returns. An average odd-year return is expected. The estimated escapement in the 1991 brood year was 576,000 pink salmon, which was lower than escapements in 1985 and 1987, above the 1989 escapement, and substantially above the interim escapement goal of 150,000 to 250,000 fish.

Taku River fall chum salmon production is expected to be poor, as has been the case in recent years.

Escapement Goals

Interim escapement goals set by the TRTC for salmon spawning in Canadian portions of the Taku River are as follows:

Species	Interim Escapement Goal Ranges	
	From	To
Sockeye	71,000	80,000
Coho	27,500	35,000
Chinook	13,200 (index count) ²	13,200 (index count)
Pink	150,000	250,000
Chum	50,000	80,000

Harvest Sharing Objectives

Annex IV of the Pacific Salmon Treaty which specifies harvest sharing arrangements for salmon originating in Canadian portions of the Taku River expired in 1992. In June of 1993 the Parties negotiated an extension of the expiring harvest and management arrangements of Taku River stocks for the 1993 fishing season. Therefore the following harvest sharing provisions will apply:

Species	Canadian Share	United States Share
Sockeye	18% of TAC	82% of TAC
Coho	3,000	
Chinook, Pink, Chum	Incidental Harvest	

Both Parties agree to take appropriate management actions to ensure that the escapement goals for chinook salmon bound for Canadian portions of the Taku River are achieved by 1995.

Collateral United States management goals for the District 111 fishery are as follows:

1. Provide for an orderly fishery while harvesting those fish in excess of spawning

² The Transboundary Technical Committee recently revised the interim escapement goal range for Taku River chinook salmon to make it more relevant to the current index escapement monitoring system. The former goal of 25,600 to 30,000 chinook salmon was a system-wide goal. Unfortunately, there is not an annual program to estimate the system-wide escapement. There is, however, an annual index escapement monitoring program using aerial surveys of some key spawning areas. Therefore, it seemed more appropriate to express the goal in terms of the index, for which annual data is collected, than in terms of a total system escapement which requires a number of unquantified and variable assumptions to be made in order to arrive at an annual estimate.

The new interim index escapement goal is 13,200 chinook salmon which was developed by summing the peak counts between 1965 and 1981 for each of six index areas including the Nakina, Nahlin, Dudidontu, Kowatua and Tatsamenie rivers, and Tseta Creek. Management systems have not yet evolved to actively target chinook escapement goals, although both countries have adopted conservative management plans with respect to chinook salmon to enable stocks to rebuild by 1995.

escapement needs in the Taku River, subject to harvest sharing obligations;

2. Promote the harvest and processing of good quality fish within the constraints dictated by run size;
3. Manage, in conjunction with other drift gillnet fisheries in the region, to minimize chinook catches in District 111 and to keep the all-district catch below 7,600 chinook salmon (exclusive of Alaska hatchery add-on fish);
4. Minimize, to the extent practical, the incidental harvest of immature chinook salmon; and
5. Provide for sufficient salmon spawning escapements to the Port Snettisham and Stephens Passage streams.

Management Procedures

The management coordination between U.S. and Canadian fishery managers will involve weekly conferences between designated managers or alternates.

United States: Section 11-B (Taku Inlet, Stephens Passage; Figure 2) will initially open for a 72-hour period on the third Sunday of June (June 20, statistical week 26). The summer fishery will be managed on the strength of the sockeye salmon return. Run strength will be evaluated from fishery CPUE data and from weekly escapement estimates derived from the Taku River fish wheel mark-recapture project operated jointly by ADF&G and DFO. Analysis of scale pattern and brain parasite incidence data will be used postseasonally to estimate the contributions of Taku River and Port Snettisham sockeye salmon to the District 111 catch.

Conservation of Port Snettisham sockeye salmon returns will again be necessary in 1993 to rebuild escapements of these stocks to historical levels. Port Snettisham will be closed inside a line from Point Anmer to Point Styleman through approximately August 14, with the following exceptions; 1) openings in Speel Arm in June and early July to harvest Snettisham Hatchery chinook salmon, and 2) openings in a small area at the head of Gilbert Bay which may be allowed in late July or early August to harvest an expected return of sockeye from a Snettisham Hatchery enhancement project at Sweetheart Lake. Sockeye returning from the Sweetheart project can not access spawning areas in Sweetheart Lake because the outlet creek is blocked to upstream anadromous fish migration. A personal use gillnet fishery may also be allowed in Gilbert Bay to ensure that the enhanced sockeye are fully utilized.

To minimize the harvest of mature wild stock chinook salmon, Taku Inlet will be closed north of the latitude of Jaw Point during the first week of the fishery (Figure 3). Night closures will be imposed if catches of juvenile chinook salmon (feeders) are above average levels. Based on catch rates in previous years, night closures could be expected through the end of July. Chinook salmon returning to the Snettisham Hatchery will not be used for broodstock in 1993. Therefore, Speel Arm will be opened for harvesting surplus hatchery chinook salmon during the first three

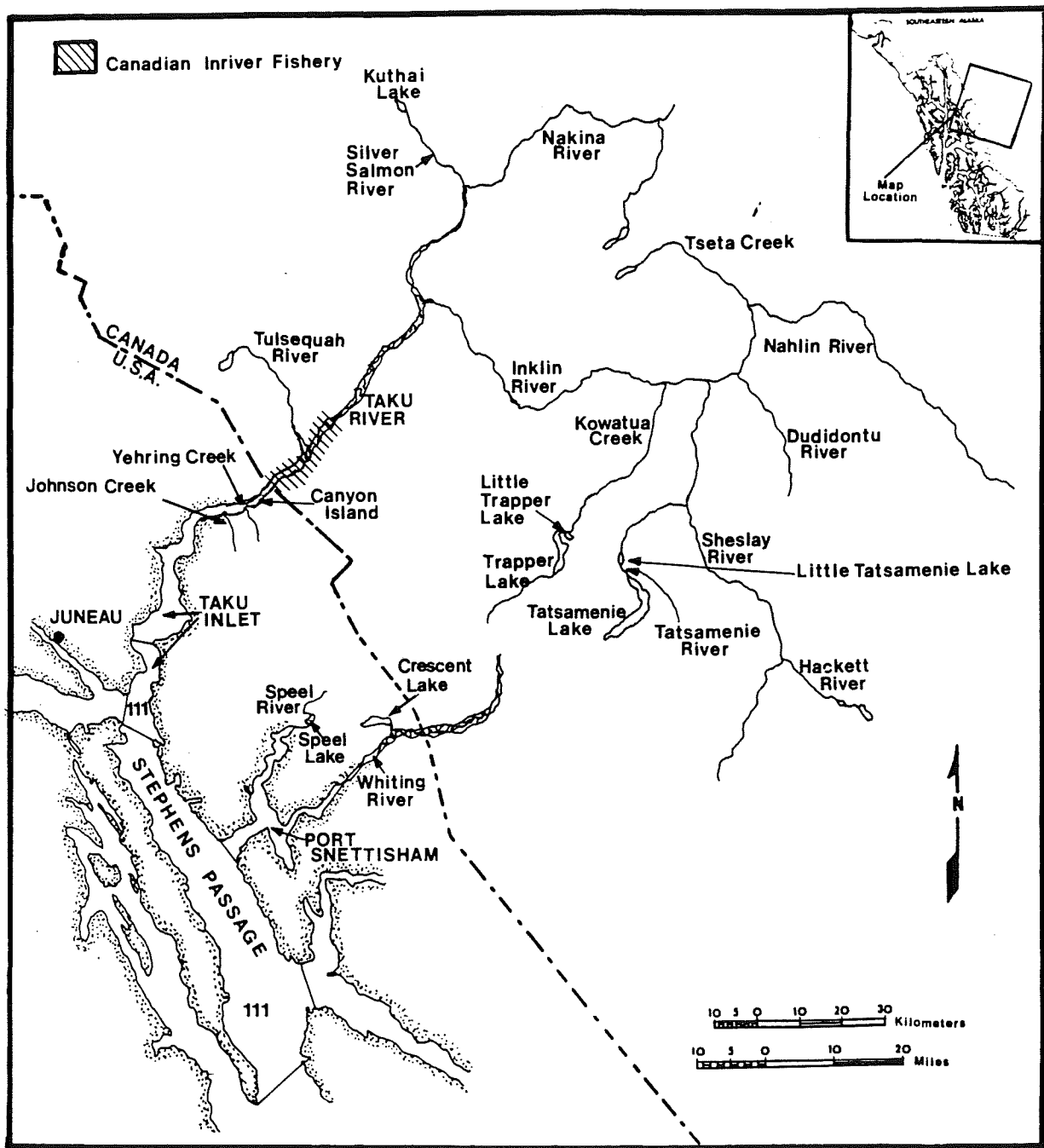


Figure 2. The Taku River and principal U.S. and Canadian fishing areas.

weeks of the Section 11-B gillnet fishery. These openings will be for 48-hour periods following the normal weekly closure of the gillnet fishery.

Since the 1993 Snettisham Hatchery chum salmon return to Limestone Inlet is not expected to be large, extended fisheries in the area may not be necessary to harvest the return. If the chum salmon return is larger than expected, additional fishing time may be allowed in Stephens Passage to harvest these fish. A 6-inch (152 mm) minimum mesh size restriction may be employed in Section 11-B south of Circle Point to minimize the catch of sockeye salmon during these openings. The Douglas Island Pink and Chum (DIPAC) hatchery facility is expecting returns of 930,000 pink and 300,000 summer chum salmon in 1993. There will be no specific commercial fishery targeted on these stocks, although they will be harvested as an incidental catch in the District 111 sockeye salmon fishery.

Directed gillnet management for harvesting Taku River and upper Stephens Passage pink salmon stocks is not anticipated in Section 11-B. Pink salmon will be harvested incidentally to the sockeye and chum salmon fishery, north and south of Circle Point, respectively. Fishing time for pink salmon in Section 11-C will depend on the strength of returns to streams in lower Stephens Passage, Seymour Canal, and the northern portions of District 110. Based on the good 1991 parent year pink salmon escapements in Section 11-C, openings in that area may occur in early August.

In 1989, the Alaska Board of Fisheries reopened the purse seine fishery in a small area in northern Chatham Strait (Sub-District 112-16) during the month of July in order to harvest pink salmon stocks migrating northward to Taku River, Lynn Canal and upper Stephens Passage. The area encompasses waters along the western shore of Admiralty Island north of Point Marsden (Figure 3). This area had been closed during July since 1984. A harvestable surplus of pink salmon returning to this area is not expected in 1993 and a July seine fishery will probably not occur in the Hawk Inlet Shore area. During August, fishery openings along the Hawk Inlet Shore may extend northward to the latitude of Hanus Reef Light when north-migrating pink salmon stock strength warrants. In addition, if north-migrating pink salmon returns are poor, and south-migrating stocks are strong, seining may be allowed only south of Point Marsden.

Beginning in mid-August, management emphasis of the Taku/Snettisham gillnet fishery will switch to fall chum and coho salmon. Fishing time and area will then be dependent upon developing run strengths of the wild stocks of fall chum salmon and coho salmon. Management will be based on evaluation of catch, effort, and CPUE relative to historical levels, and on escapement estimates developed from the Taku River mark-recapture project. DIPAC personnel project returns of 147,000 coho salmon in 1993 from releases at its Gastineau Channel facilities; no additional fishing time will be allowed to harvest DIPAC returns.

The chinook sport fishing season will be open in the marine waters near Juneau throughout the year. However, Taku Inlet, north of a line from Point Bishop to Dorothy Creek, will be closed to sport fishing from April 16 through June 14 to protect returning Taku River chinook salmon. The daily bag and possession limits were two chinook salmon per person in recent years; however, this was restricted to one salmon per person after May 15, 1992. Further restrictions in the S.E. Alaska sport fishery may be implemented if the sport harvest exceeds the limit

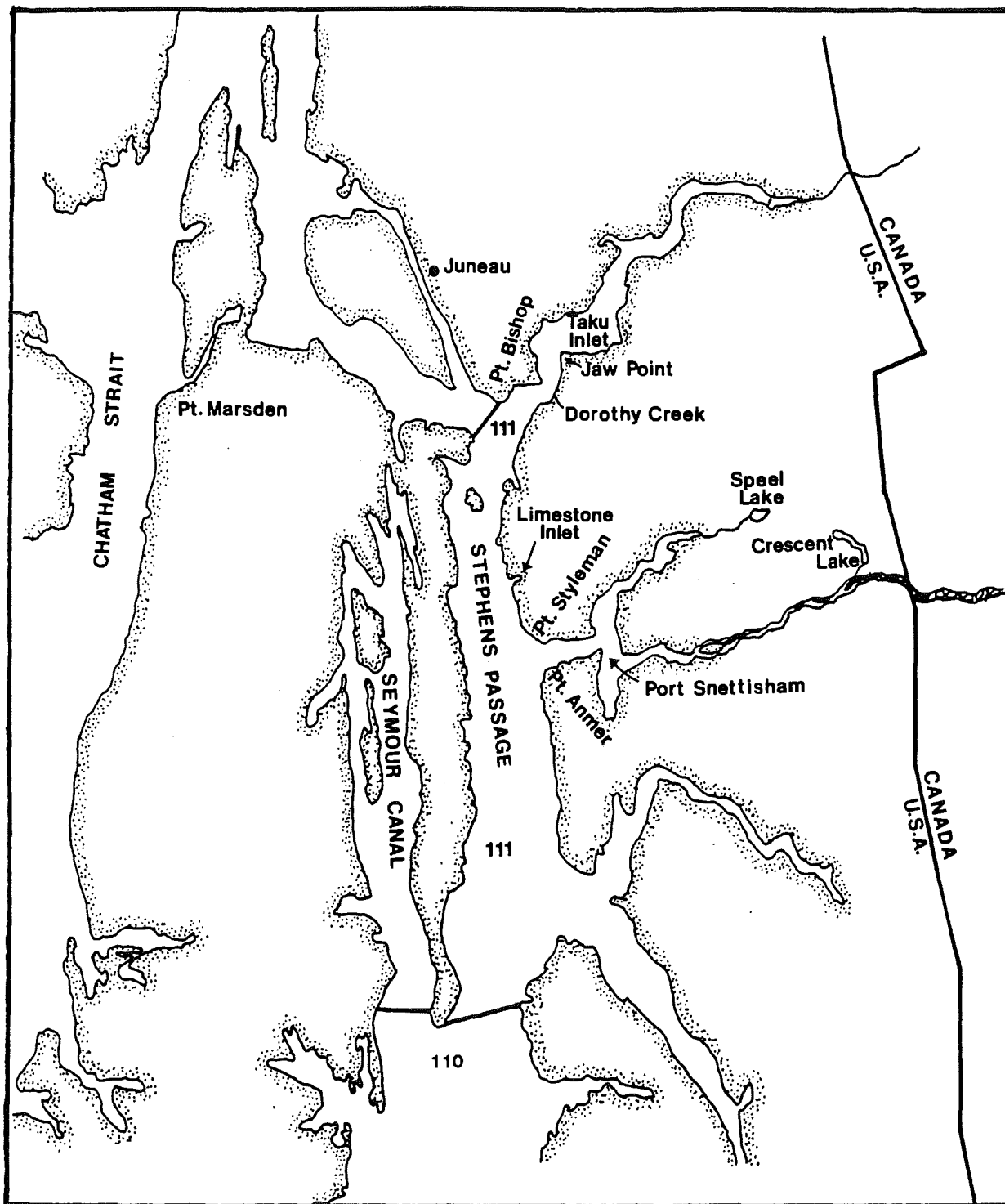


Figure 3. Location of U.S. fishing areas adjacent to the Taku River.

stipulated by the Pacific Salmon Treaty.

A personal use fishery in U.S. portions of the Taku River was established by the Alaska Board of Fisheries in 1989 and will operate during the month of July in 1993. A seasonal bag limit of five sockeye salmon per person or ten sockeye salmon per household will be allowed to be taken using set gill nets.

Canada: The Canadian fishery will open Monday, June 21 for an initial 48 hour period to target early sockeye runs. A maximum mesh size restriction of 146 mm (5¾ inches) will be in effect through mid-July to conserve chinook salmon during the early season sockeye fishery.

Canadian sockeye management decisions for the Taku River fishery (Figure 2) will be based on weekly projections of total run size and total allowable catch (TAC). The weekly projection of the seasonal TAC will be made using the following calculations:

$$TAC = \frac{E_w + CC_w + (AC_{w-1})}{PRT_w} - Eg;$$

Where:

TAC	=	the projected total allowable catch for the season;
E_w	=	the total escapement to date, i.e., to week w ;
CC_w	=	the total Canadian catch to date, i.e., to week w ;
AC_{w-1}	=	the estimated cumulative Alaskan catch of Taku sockeye to the preceding week $w-1$ (preceding week used to allow for migration time). Catches in Districts 111 and 112 will be considered for inclusion in this estimate;
PRT_w	=	the estimated proportion of run through to week w determined from the average inriver run timing based on historical CPUE data from the Canadian fishery. (Run timing estimates will be adjusted inseason according to inseason CPUE data relative to historical data in both U.S. and Canadian fisheries); and
Eg	=	the system-wide escapement goal. (A value of 75,000 will be used reflecting the midpoint in the interim range of 71,000 to 80,000).

Weekly TAC projections for sockeye salmon will be used to develop the total Canadian guideline harvest by applying the 18% allocation specified in Annex IV of the Treaty. Run timing will be used to apportion the projected total season catch into weekly harvest guidelines.

The Canadian fishery will be monitored daily by a resident DFO Fishery Officer and/or Guardian who will collect catch and tag recovery information. Catch information will be relayed to the DFO office in Whitehorse, collated, and exchanged with a designated ADF&G contact person during weekly telephone contacts. Tag recovery information will be forwarded to the DFO/ADF&G tagging crew located at Canyon Island, Alaska.

Weekly and cumulative sockeye population and escapement estimates will be developed from catch and tag recovery information. Examination of these factors will be used to determine if the Canadian sockeye catch is on target; adjustments will be made to weekly fishing time to compensate for deficit/surplus situations.

ALSEK RIVER

Preseason Forecasts

The overall Alsek-Tatshenshini sockeye run is expected to be below average in 1993 with below average early and late runs. The escapement past the Klukshu River weir in 1988, the principal brood year, was only 7,737, the second lowest on record. The early-run weir counts in the 1988 and 1989 brood years were 585 and 3,400, compared to the 1983 to 1992 average of 3,206 sockeye. The late-run sockeye count in 1988 was 8,756, the third lowest on record, and only 57% of the 1983 to 1992 average.

The 1993 coho run is expected to be average. Brood year index counts at the Klukshu River weir in 1989 and 1990 were 2,219 coho and 315 coho, respectively, compared to the 1983 to 1992 average count of 1,739 coho.

The chinook salmon return in 1993 is expected to be near the previous 10-year average, based on parent-year escapements to the Klukshu system. The escapement in the principal brood year (1988) was 1,994, close to the 1983-1992 average escapement of 1,971. Escapements in 1987 and 1989 were 2,491 and 2,289 respectively.

Escapement Goals

Interim escapement goals set by the TRTC for salmon spawning in the Canadian portion of the Alsek River drainage are:

Species	Interim Escapement Goal Ranges	
	From	To
Sockeye	33,000	58,000
Coho	5,400	25,000
Chinook	4,700 (Klukshu only) ³	4,700 (Klukshu only)

³ The TRTC recently revised the interim escapement goal range for Alsek River chinook salmon to make it more relevant to the current index escapement monitoring system. The former goal of 5,000 to 12,500 chinook salmon was a system-wide goal. As with the other transboundary rivers, there is no annual program established to estimate the system-wide escapement. It seemed more appropriate to develop a goal which had direct relevance to data collected consistently on an annual basis and was free of a number of unquantified expansion factors (which were necessary to estimate system-wide escapement). The new interim index escapement goal is 4,700 chinook salmon in the Klukshu River (weir count minus IFF catch upstream); this represents the average of the Canadian goal of 5,000 chinook, and the U.S. goal of 4,400 chinook.

Harvest Sharing Objectives

Annex IV of Pacific Salmon Treaty requires that the Parties take the necessary management actions to rebuild Alsek chinook and early-run sockeye salmon stocks.

Management Procedures

United States: The initial opening for the Alsek River fishery (Dry Bay, Figure 4) during the 1993 season will be for 24 hours on the second Monday in June (June 14). The initial opening is in statistical week 25, a delay of about one week relative to fishery openings between 1963 and 1982. Prior to 1963 the fishery opened in May. The early sockeye run is not expected to be large enough to support much harvest, and fishing will be limited to 24 hours to reduce the harvest of chinook salmon and early-run sockeye salmon. The next week's opening will be for a 24-hour period starting the following Monday. An extension of fishing time may be allowed if sockeye salmon run strength is sufficient and the harvest of chinook salmon can be kept low. The duration of fishing periods during the remainder of the sockeye salmon season will be based on evaluation of sockeye salmon catches and effort levels. Gill nets will be restricted to a maximum mesh size of 6 inches (152 mm) through July 1 to minimize incidental chinook salmon harvests.

After the first several weeks of the fishing season, U.S. managers will use inseason sockeye salmon abundance models to predict the Dry Bay catch and the total index run size (Dry Bay catch plus Klukshu weir count). Total season abundance predictions generated inseason with these models have generally been very accurate as early as the third week of the season.

The Alsek River sockeye salmon run in the lower river is nearly over by early to mid-August. Management emphasis will then be switched to coho salmon. Fishing time during the coho salmon fishery will be based on a comparison of current year fishery performance with historical performance.

The Alsek River surf fishing area will likely be open during the same time period as the inriver fishery. The surf fishery areas include the shoreline, 3/4 of a mile (1.2 km) in each direction from the river mouth to the outermost bar where the surf breaks.

Canada: Management of both the sport and Indian food fisheries in the Alsek River (Figure 4) will be similar to that of the last several years with conservation measures in place to protect chinook and early-run sockeye salmon. Reduced effort in the Aboriginal food fishery and sockeye nonretention in the sport fishery will be instituted prior to August 15 to protect early run sockeye. Conservation catch limits (one chinook/day) and weekly closed periods will be implemented in the sport fishery to conserve chinook salmon. The escapement of chinook and sockeye salmon through the Klukshu weir serves as an inseason indicator of stock strength and adjustments to the fishery may be made on the basis of weir counts.

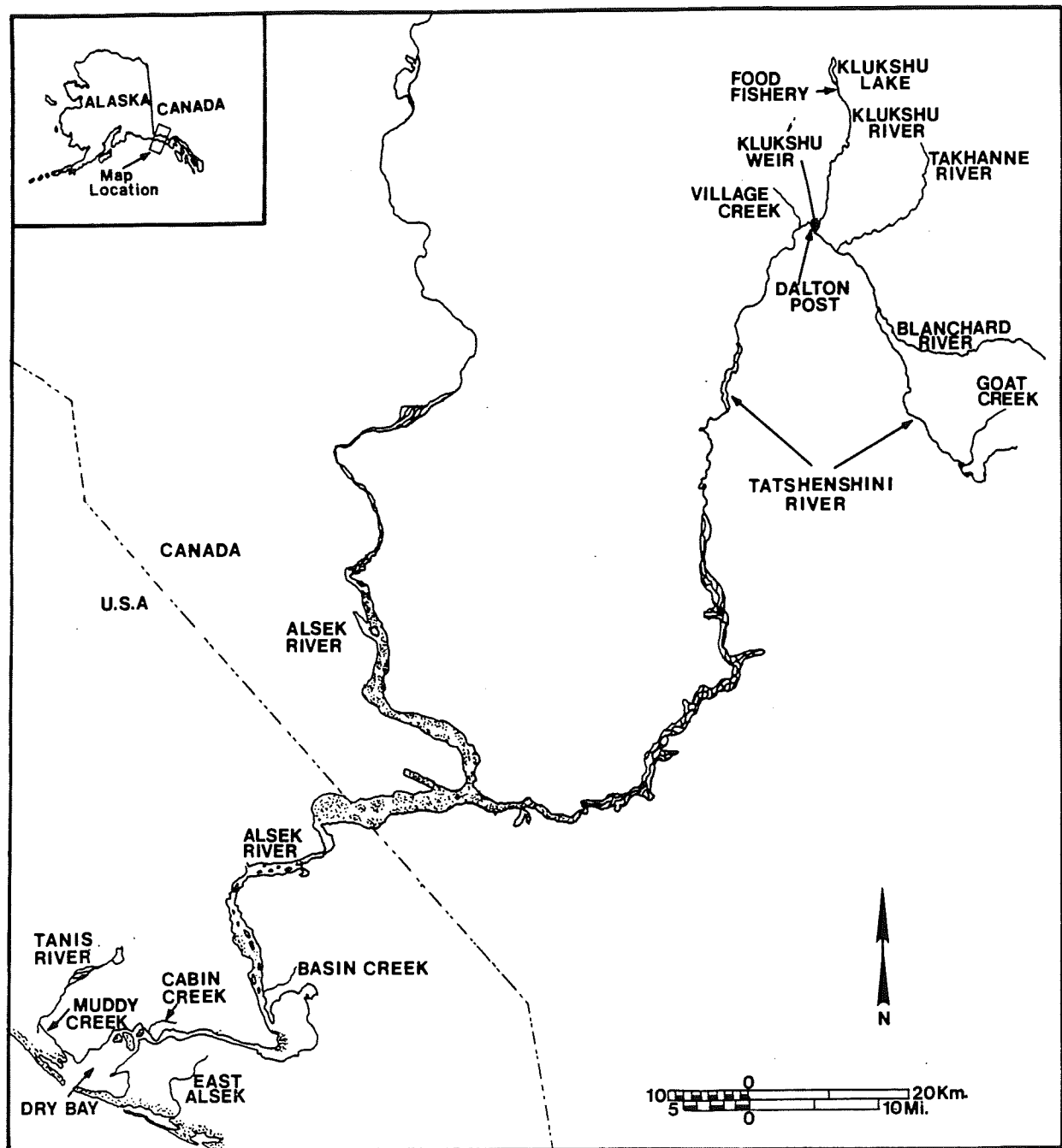


Figure 4. Location of the principal U.S. and Canadian fishing areas where Alsek River salmon are caught.

1993 TRANSBOUNDARY ENHANCEMENT PLANS

Fry Plants

Stikine River System

The target egg-take goal of 5.4 million eggs for Tahltan Lake in 1992 was almost met. The preliminary estimate of the number of eggs taken actually was 5.4 million, but this estimate was later adjusted downward to 4.9 million after eggs were sorted at the hatchery.

Tahltan Lake: A total of 1.9 million fry from the 1992 Tahltan Lake sockeye egg-take was planted back into Tahltan Lake. The survival rate from green-egg to out-planted fry was 90.4%. The otoliths of this group of alevins were mass marked with a band of 7 rings. Fry out-planting into Tahltan Lake took place between June 23 and July 2.

Tuya Lake: A total of 2.0 million fry from the 1992 Tahltan Lake sockeye egg-take was planted into Tuya Lake. Survival in the CIF was high until an outbreak of IHNV occurred in the Tuya Lake fry, and approximately 521,400 fry were destroyed. Survival from green egg to out-planted fry was 72.7%. Thermal marking of the otoliths of this group of alevins was completed; the mark consists of a band of 5 rings. Out-planting of fry to Tuya Lake took place between June 16 and July 7.

Fry originating from the 1992 Tahltan sockeye egg-take were out-planted to both Tahltan and Tuya Lakes in accordance with the Pacific Salmon Treaty agreement regarding Stikine River sockeye enhancement. The agreement states: "When the sockeye escapement through the Tahltan Lake weir is greater than 15,000, the fry will be distributed to Tahltan and Tuya lakes in a manner which maximizes harvestable production and provides information on the potential production capacity of Tuya Lake." At Tahltan escapements of less than 15,000 sockeye, all fry are to be returned to Tahltan Lake. In 1992, the Tahltan Lake sockeye escapement of 59,907 fish exceeded the 15,000 fish guideline for the second time since outplanting of this stock began. This year's out-plant represents the second year that Tahltan Lake sockeye fry were placed into Tuya Lake. The TRTC proposed that Tahltan Lake receive fry resulting from 4 incubation boxes of eggs and Tuya Lake receive fry resulting from 5 incubation boxes for the following reasons:

1. Tuya Lake is large in area and has a rich, under-utilized plankton forage base. It is postulated that a minimal outplant of 2.0-2.5 million fry is required to allow effective monitoring of their growth, survival, and any impact on the forage base.
2. Although Tuya Lake appears to have an under-utilized carrying capacity that would accommodate much more than the number of available sockeye fry, there was believed to be some element of risk in the outplant to Tuya Lake since fry from the initial year's plant into Tuya Lake had not yet outmigrated as smolts at the time the fry stocking plans were developed. Rather than commit all fry to

Tuya Lake, the TRTC decided that a substantial number of fry should be out-planted to Tahltan Lake, where successful survival to the smolt stage had been demonstrated and there was a reasonable assurance of good production.

Taku River System

Tatsamenie Lake: A total of 1.5 million eggs was collected at Little Tatsamenie Lake, slightly below the egg-take goal of 1.75 million. Approximately 909,000 fry from this egg-take were planted into Tatsamenie Lake, with survival from green egg to outplanted fry of 61.2%. Approximately 246,000 fry were destroyed shortly before planting because the fry were displaying signs of IHNV. Otoliths of these alevins were marked with 2 bands, one consisting of 4 rings and one of 3 rings. Outplanting took place between July 9 and 14.

Trapper Lake: A total of 2.5 million eggs was collected at Little Trapper Lake, slightly below the egg-take goal of 2.75 million. Approximately 1.1 million fry from the 1992 Little Trapper Lake egg-take were planted into Trapper Lake. Poor survival was experienced in the CIF because of outbreaks of IHNV in the fry. Approximately 916,000 fry were destroyed after displaying signs of IHNV. Survival from green egg to out-planted fry was only 44.2%. Otoliths of the alevins of this group were marked with 2 bands, one consisting of 7 rings and one of 3 rings. Outplanting took place between June 25 and July 2.

Egg Collections

The following 1993 levels of egg collections were agreed by the TRTC:

Stikine River:	Tahltan Lake	- 6.0 million;
Taku River:	Little Tatsamenie Lake	- 2.0 million
	Little Trapper Lake	- <u>1.0 million</u>
	TOTAL	3.0 million.

The 1993 target level of 6.0 million sockeye eggs for the Stikine drainage meets the Treaty requirement of 5-6 million eggs; however, the target of 3.0 million for the Taku drainage is less than the 5 million specified in the Treaty. The TRTC is recommending this reduced target in the Taku drainage in 1993 for the following reasons:

1. There are serious concerns with the Trapper Lake enhancement program. Despite intensive sampling over 2 years, only 1 smolt has been captured leaving Trapper Lake, suggesting that fry planted in Trapper Lake are either: 1) leaving Trapper Lake prior to smolting; 2) not surviving to smolt stage; or 3) residing in the lake and not migrating to sea. It is known that at least a portion of the enhanced fry have migrated from Trapper Lake downstream to Little Trapper Lake shortly after being planted in the upper lake. Seasonal trends in zooplankton abundance and apparent density dependent effects on the size of smolts in Little Trapper Lake indicate that the rearing potential of this lake is

already reached by wild fry, raising concerns that the addition of enhanced fry from Trapper Lake may stress the smaller system. Additionally, substantial mortalities have annually been experienced in the Snettisham CIF among Little Trapper Lake eggs and fry. By limiting the size of the egg take, the TRTC believes that; 1) an additional year of project assessment can be gained, 2) it is desirable to continue providing at least some level of adult returns to fishermen from this program, 3) minimal harm can be done to Little Trapper Lake, and 4) monetary savings from the reduced program can be redirected toward improved assessment of Taku River enhancement programs and potential opportunities.

2. A goal of 2.0 million eggs from Little Tatsamenie Lake represents a 34% increase over the maximum number of eggs previously taken (1.5 million in 1992) and is believed to be the highest number that can presently be reasonably handled, subject to the Canadian guideline of a maximum of 30% of the total escapement to be taken for broodstock purposes.
3. The TRTC believes that improved assessment of Taku River enhancement projects is necessary. Projects are proposed to monitor movement of fry between Trapper and Little Trapper lakes, test the feasibility of capturing, holding, and ripening broodstock at the outlet of Tatsamenie Lake, collect fry and limnological samples from Little Tatsamenie Lake, and conduct preliminary hydroacoustic and limnological surveys of Nakina Lake.

PROPOSED TRANSBOUNDARY FIELD PROJECTS FOR 1993

Stikine River

Proposed projects regarding Stikine River salmon stocks are summarized in Table 6. For each project listed, corresponding information regarding the primary objectives, dates of operation, and agency roles and contacts are described. Several changes are proposed in the Stikine River field programs from those conducted in 1992 including eliminating the marine inseason scale pattern analysis and implementing an otolith sampling program in District 108 to estimate contribution of enhanced sockeye salmon to that fishery.

Taku River

Proposed projects regarding Taku River salmon stocks are summarized in Table 7. For each project listed, corresponding information regarding the primary objectives, dates of operation, and agency roles and contacts are described. Several changes are proposed in the Taku River field programs from those conducted in 1992 including delaying the second year of the coho salmon radio tagging program until 1994 and eliminating operation of the Little Tatsamenie weir for coho salmon enumeration.

Alsek River

Proposed projects regarding Alsek River salmon stocks are summarized in Table 8. For each project listed, corresponding information regarding the primary objectives, dates of operation, and agency roles and contacts are described. The overall Alsek field program is similar to 1992.

Transboundary Enhancement

Proposed projects regarding joint transboundary river salmon enhancement are summarized in Table 9. For each project listed, corresponding information regarding the primary objectives, dates of operation, and agency roles and contacts are described. Several expanded assessment projects related to joint Stikine and Taku River enhancement are planned for 1993.

Table 6. Proposed Stikine River field projects, 1993. ^a

Location	Function	Dates	Agency	Responsibility
District 106 & 108 Fishery	Sample 20% of chinook, coho, chum, and sockeye catches per district for CWT; sample 600 sockeye per week from 106-41, 106-30, and 108 for age, sex, length. Collect 400 otolith samples per week from sockeye per week in District 108.	6/20-9/20	ADF&G	All aspects
Lower Stikine	Conduct test fishery to assess size and timing of sockeye run. Collect age, sex, length, weight information and recover CWT's from all salmon species. Sample all sockeye for scales and all females for egg diameter (used for stock i.d.). From commercial fishery sample 100 females per week for egg diameter and 350 fish/ week for age, sex, and length.	6/17- 9/15	DFO	All aspects
Tahltan Lake	Estimate age, size, and timing of sockeye smolt outmigration.	5/04-6/14	DFO	All aspects
	Enumerate adult sockeye and collect age, sex, length data from 800 fish.	6/15-9/06	DFO	All aspects
	Sample smolts for otoliths.	5/04-6/14	DFO ADF&G	Smolt collection Otolith analysis
	Sample 250 male and 250 female adult sockeye from Tahltan Lake egg-take for otoliths and collect scale samples from 100 small sockeye salmon.	9/06-10/08	DFO	All aspects
	Analyze Tahltan Lake otoliths for thermal mark.	winter	ADF&G	All aspects
Little Tahltan	Enumerate adult chinook salmon and collect age, sex, length data (800 samples).	6/23-8/21	DFO	All aspects
Tahltan River, Little Tahltan, Beatty & Andrew cr.	Aerial survey estimates of spawning chinook salmon in index areas.	8/10-8/15	ADF&G	All aspects
Lower Stikine	Aerial surveys of spawning coho salmon in mainstem tributaries from mouth to U.S./Canada border, and from border upstream.	10/05-31	ADF&G DFO	U.S. systems Canadian systems

^a Contacts: Pete Etherton (DFO) - All DFO projects
Keith Pahlke (ADF&G) - Chinook aerial surveys
Brian Lynch (ADF&G) - District 106 & 108 fishery sampling
Kathleen Jensen (ADF&G) - District 106 and 108 sockeye stock ID
Pete Hagen, Kris Munk - Otolith analysis

Table 7. Proposed Taku River field projects, 1993. ^a

Location	Function	Dates	Agency	Responsibility
Nakina River	Chinook carcass weir; enumerate and sample 1,000 chinook for age, sex, length and all other chinook for sex, length.	7/26-8/26	TRTFN	All aspects
	Sample Nakina and Silver Salmon origin sockeye for age, sex, length.		TRTFN	All aspects
	Recovery of tags from adult pink	8/12-16	DFO/ADF&G	All aspects
	Creel census	6/02-7/20	TRTFN/DFO	All aspects
Little Trapper Lake	Adult sockeye salmon weir; enumerate and sample for age, sex, length (750 samples) and recover spaghetti tags.	7/16-9/12	DFO	All aspects
Little Tatsamenie Lake	Adult sockeye salmon weir; enumerate and sample for age, sex, length (750 samples) and recover spaghetti tags.	7/25-9/19	DFO	All aspects
Kuthai Lake	Adult sockeye salmon weir; enumerate and sample for age, sex, length (600 samples); recover spaghetti tags.	7/10-9/01	TRTFN	All aspects
Nahlin River	Adult salmon weir (chinook, sockeye, and coho); enumerate and sample for age, sex, length (600 chinook, 600 sockeye, and 400 coho samples); recover spaghetti tags.	6/15-9/23	TRTFN	All aspects
Canyon Island	Mark-recapture studies to estimate sockeye, pink, and coho escapement. Sample 260 sockeye/wk for age, sex, and length, and 520 coho and chum for the entire season. Sample 400 pinks from fishwheel catches for otoliths.	6/07-8/30	ADF&G	Three personnel, June 7-Aug. 30, including one biologist until Oct. 15 if funding permits; shared camp facilities, supplies.
		6/07-10/15	DFO	Two personnel, June 7 - August 30, and to Oct. 15 if funding permits; shared camp facilities, supplies.
Lower River	Juvenile coho trapping. CWT tag all coho and chinook smolts, sample for scales.	5/01-6/30	ADF&G	All aspects
Esc. Sampling	Sample sockeye escapement in mainstem areas for age, sex, length (400 samples per area); recover spaghetti tags.	9/5-10/10	ADF&G/DFO	All aspects

-Continued-

Table 7. Proposed Taku River field projects, 1993. Continued. ^a

Location	Function	Dates	Agency	Responsibility
Canadian Fishery	Recover spaghetti tags from sockeye, coho, and pink salmon. Recover CWT'd coho. Sample coho and sockeye for age, sex, length (200 samples per week for sockeye; 520 per season for coho).	6/21-8/30	DFO/ADF&G	Sampling will be conducted by the Canyon Island crew. Tags will be collected by DFO Fisheries Guardian.
Canadian Test Fishery	Recovery of tagged fish and catch sampling for CWT'd coho. Sample approximately 400 coho for age, sex, length information.	8/01-10/10	DFO/TRTFN?	All aspects pending funding.
District 111 Fishery	Sample 20% of chinook, coho, chum catches for coded-wire tags; sample sockeye and chum salmon for age, sex, length (goals are 600 and 300 per week for sockeye and chum). Collect 250 matched brain-scale sockeye samples per week.	6/21-9/30	ADF&G	All aspects
Nakina, Nahlin, Dudidontu, Tatsamenie, Kowatua and Tseta	Aerial surveys of spawning chinook salmon in index tributaries.	7/25-8/25	ADF&G	All aspects
Flannigan Slough, Fish, Yehring, Moose, Johnson, and Sockeye creeks	Coho helicopter and foot surveys	9/15-10/31	ADF&G	All aspects
Speel, Crescent, and Sweetheart lakes	Sample sockeye escapements for age, sex, length, and brain parasite and otolith samples	9/15-10/01	ADF&G	All aspects

^a Contacts: Scott McPherson (ADF&G) - Lower river coho smolt tagging
 Andy McGregor (ADF&G) - Canyon Island, U.S./Canada fishery sampling, sockeye esc. samp.
 Keith Pahlke (ADF&G) - Chinook aerial surveys
 Pat Milligan (DFO) - Contact for all DFO Taku projects
 Kathleen Jensen (ADF&G) - Sockeye stock identification
 Pete Hagen, Kris Munk - Otolith analysis

Table 8. Proposed Alsek River field projects, 1993.^a

Location	Function	Dates	Agency	Responsibility
Klukshu River	Enumerate chinook, sockeye, and coho at adult weir; estimate sport and food fishery catches; collect age, sex, length and CWT's on all salmon species (750 scale samples per species),	5/23-10/20	DFO	All aspects
	Coded-wire tag and release approx. 30K juvenile chinook reared at Klukshu incubation box.	6/15-7/15	DFO	All aspects
Village Creek	Enumerate spawning sockeye using an electronic counter.	6/10-10/18	DFO	All aspects
Blanchard, Takhanne, and Klukshu rivers and Goat Creek	Aerial surveys of spawning chinook salmon in index areas.	8/10	ADF&G	All aspects
Lower Alsek	Sample commercial catches of all salmon at lower Alsek and East river. Collect age, sex, length data (520 per species). Sample catches for CWT'd chinook.	6/14-9/15	ADF&G	All aspects
Cabin, Tanis, Muddy and Basin creeks	Aerial surveys of spawning sockeye salmon in index areas.	8/01-8/15 10/1-10/15	ADF&G	All aspects

^a Contacts: Pete Etherton (DFO) - All DFO projects
Keith Pahlke (ADF&G) - Chinook aerial surveys
Andy McGregor (ADF&G) - Lower Alsek and East rivers commercial catch sampling
Keith Weiland (ADF&G) - All ADF&G projects

Table 9. Proposed enhancement projects for transboundary rivers, 1993. ^a

Location	Function	Dates	Agency	Responsibility
Tahltan Lake	Backplant sockeye fry from Snettisham Hatchery.	6/01-7/01	ADF&G	All aspects
			ADF&G	Disease sampling
	Take 6.0 million sockeye eggs.	9/01-9/30	DFO ADF&G	Egg take & transport Incubation & otolith marking.
	Hydroacoustic/limnological surveys to evaluate success of fry outplants.	6/01-9/30	DFO	All aspects
Tatsamenie Lake	Backplant sockeye fry from Snettisham.	6/01-7/01	ADF&G	All aspects
	Hydroacoustic/limnological surveys to evaluate success of fry outplants.	6/01-9/30	DFO	All aspects
	Sample smolt outmigration (2-3 trips/300-500 samples).	5/10-6/04	DFO	All aspects
	Feasibility broodstock capture, holding, ripening studies at lake outlet.	9/10-30	DFO	All aspects
Little Tatsamenie Lake	Take 2.0 million sockeye eggs.	8/15-9/30	DFO ADF&G	Egg take & transport Incubation & otolith marking
	Sample fry for otoliths and limited limnological sampling.	8/01-9/30	DFO	All respects
Trapper Lake	Backplant sockeye fry from Snettisham.	6/01-7/01	ADF&G	All aspects
	Hydroacoustic/limnological surveys to evaluate success of fry outplant.	6/01-9/30	DFO	All aspects
Little Trapper Lake	Take 1.0 million sockeye eggs.	9/01-9/30	DFO ADF&G	Egg take & transport Incubation & otolith marking
Trapper and Little Trapper lakes	Sample smolt outmigration.	spring-summer	DFO	All aspects
Tuya Lake	Backplant sockeye fry from Snettisham.	6/01-7/01	ADF&G	All aspects
	Seasonal plankton sampling.	6/01-9/30	DFO	All aspects
	Sampling of outmigrant smolts.	5/01-6/15	TTC/DFO	All aspects
Nakina Lake	Hydroacoustic/limnological survey.	8/20-9/15	DFO	All aspects, pending funding
Snettisham Hatchery	Incubation and thermal marking of juvenile sockeye.	9/01-6/01	ADF&G	All aspects

^a Contacts: Bruce Morley, Pat Milligan, Doug Lofthouse - All DFO projects
Cheri Frocklage (Tahltan Tribal Council;TTC) - All TTC programs
Scott Kelley, Andy McGregor (ADF&G) - All ADF&G projects
Pete Hagen, Kris Munk (ADF&G) - Otolith analysis